What Is Claimed Is:

1. A fuel injector for use with an internal combustion engine, the fuel injector comprising:

a tube assembly having a longitudinal axis and including:

a non-magnetic tube having a first end and a second end;

a pole piece disposed inside the non-magnetic tube intermediate the first and second ends;

an armature assembly disposed within the tube assembly between the pole piece and the first end, the armature assembly including an end face resiliently biased away from the pole piece;

a working air gap separating the end face and the pole piece when the end face is biased away from the pole piece;

a coil connectable to an electrical power source and operable to displace the end face toward the pole piece against the resilient bias on the armature assembly; and

a housing positioned adjacent the working air gap and supporting the coil on the tube assembly, the housing extending around the coil and having a ferromagnetic inner wall extending between the coil and the non-magnetic tube, the ferromagnetic inner wall has an opening with a width that is substantially less than the length of the coil as measured parallel to the longitudinal axis.

2. The fuel injector according to claim 1, wherein the housing is centered about the working air gap along the longitudinal axis.

3. The fuel injector according to claim 1, wherein the pole piece has an annular wall;

the armature assembly further includes an ferromagnetic member with an annular wall;

the ferromagnetic inner wall is annular; and

the non-magnetic tube has an annular wall that is substantially thinner than any one of the annular walls of the pole piece, the annular ferromagnetic member and the ferromagnetic inner wall.

4. The fuel injector according to claim 3, wherein the housing has a first end face, a second end face, and a center as measured along the longitudinal axis, the working air gap is located closer to the housing center than to the first and second end faces of the housing.

5. The fuel injector of claim 1, wherein the housing further includes:

first and second flanges extending away from the ferromagnetic inner wall; and

an annular wall extending between the flanges, the annular wall includes:

the ferromagnetic inner wall; and

a non-magnetic protrusion extending into the opening; and

a cylinder substantially surrounding the first and second flanges.

6. The fuel injector according to claim 5, wherein the ferromagnetic inner wall includes first and second ferromagnetic extensions directed toward each other and way from the first and second flanges, respectively.

7. The fuel injector according to claim 6, wherein the first and second ferromagnetic extensions extend substantially along longitudinal axis of the non-magnetic tube.

8. The fuel injector according to claim 7, wherein the longitudinal cross-sectional area of the ferromagnetic extensions is substantially greater than the longitudinal cross-sectional area of the non-magnetic tube adjacent the ferromagnetic extensions.

9. The fuel injector according to claim 7, wherein the non-magnetic tube includes an outer surface and the annular portions of the upper and lower bobbin portions engage the outer surface of the non-magnetic tube.

10. The fuel injector according to claim 9, wherein the coil generates a magnetic flux circuit when energized through the electrical power source, the magnetic flux circuit being external to the non-magnetic tube along the portion of non-magnetic tube engaged by the ferromagnetic extensions.

11. The fuel injector according to claim 7, wherein the coil generates a magnetic flux circuit when energized through the electrical power source, magnetic flux circuit travels along the ferromagnetic extensions.

12. The fuel injector according to claim 1, wherein the opening in the ferromagnetic inner wall is aligned with the working air gap along the longitudinal axis.

13. The fuel injector according to claim 12, wherein the opening is centered about the working air gap along the longitudinal axis.

14 The fuel injector according to claim 1, wherein the length of the non-magnetic tube equals the total length of the fuel injector as measured along the longitudinal axis.

15. The fuel injector according to claim 14, wherein the non-magnetic tube is homogenous.

16. The fuel injector of claim 1, wherein the housing further includes:

an annular sleeve; and

a bobbin inserted in the annular sleeve, the bobbin including:

a first annular member having a radial flange and an axial extension; and

a second annular member having a radial flange and an axial extension, the second annular member is concentric with the first annular member; and

the axial projections extend toward each other and are separated by the opening.

17. The fuel injector of claim 16, wherein the bobbin further includes an annular casing containing the coil and connected between the radial flanges, the annular casing including an annular projection extending into the opening.

18. The fuel injector of claim 17, wherein the ferromagnetic inner wall includes the axial extensions; the radial flanges are ferromagnetic; and the annular projection is non-magnetic.

19. The fuel injector according to claim 17, wherein the annular projection is centered about the working air gap along the longitudinal axis.

20. A fuel injector for use with an internal combustion engine, the fuel injector comprising:

a tube having a first end, a second end and a longitudinal axis;

a pole piece disposed in the tube intermediate the first and second ends;

an armature disposed within the tube and spaced from the pole piece by a working air gap as measured in the longitudinal direction, the armature being adjustably biased away from the pole piece;

a sleeve;

a bobbin inserted in the sleeve and having a ferromagnetic portion engaging the outer surface of the tube on each side of the working air gap; and

an electrical coil mounted on the bobbin, the electrical coil connectable to an electrical power source and operable to displace the armature relative to the pole piece and against the bias on the armature.

21. The fuel injector according to claim 20, wherein the tube comprises a thin-walled member.

22. The fuel injector according to claim 20, wherein the ferromagnetic portion includes a first axial extension and a second axial extension spaced along the long axis from the first axial extension, and the first and second axial extensions terminate proximate the working air gap.

23. The fuel injector according to claim 22, wherein the space between the first and second axially extending portions are centered on the working air gap.

24. The fuel injector according to claim 22, wherein the bobbin further includes first and second flanges connected to the first and second axial extensions, respectively, the first and second flanges are ferromagnetic.

25. The fuel injector according to claim 24, wherein the sleeve is ferromagnetic and the first and second flanges are connected to the sleeve.

26. The fuel injector according to claim 25, wherein the bobbin includes a non-magnetic intermediate portion in the space between the first and second axially extending portions.

27. The fuel injector according to claim 26, wherein the tube is formed from a non-magnetic material.

28. The fuel injector according to claim 27, wherein the thickness of one of the first and second axially extending portions is substantially greater than the thickness of the tube.

29. A method of assembling a fuel injector, comprises:

providing a tube assembly having a longitudinal axis and including:

a non-magnetic tube having a first end and a second end;

a pole piece disposed inside the non-magnetic tube intermediate the first and second ends;

providing an armature assembly disposed within the tube assembly between the pole piece and the first end, the armature assembly including an end face resiliently biased away from the pole piece;

separating the end face and the pole piece when the end face is biased away from the pole piece to create a working air gap;

providing a housing having a ferromagnetic inner wall, the ferromagnetic inner wall having an opening with a width that is substantially less than the length of the coil as measured parallel to the longitudinal axis;

placing in the housing a coil connectable to an electrical power source and operable to displace the end face toward the pole piece against the resilient bias on the armature assembly;

positioning the non-magnetic tube ferromagnetic inner wall between the coil and the non-magnetic tube;

positioning the housing adjacent the working air gap; and securing the housing to the tube assembly.